

SUPPORT FOR THE AMENDMENTS

This Amendment cancels Claims 16 and 18; amends Claims 1 and 17; and adds new Claim 19. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found at least in Claims 16 and 18 and in the specification page 38, Table 3, Example 6 (peel strength of 85 gf/cm). Support for new Claim 19 is found at least at Fig. 5. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-3 and 5-15, 17 and 19 will be pending in this application. Claims 1 and 8 are independent.

REMARKS

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the indication that Claim 8 is allowed. Final Rejection at page 2, line 4.

Applicants thank the Examiner for the courtesies extended to their representative during the November 21, 2002, personal interview. As discussed at the interview, the present invention provides a light, compact and thin battery having a positive and a negative electrode firmly joined together by an adhesive resin layer, which secures both electron insulation and ion conduction between the electrodes and decreases resistance between electrodes, i.e., internal resistance of the battery, to improve battery characteristics.

Claims 1-3, 5-7, 9-10, 14-15 and 17 are rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,096,456 ("Takeuchi"). In addition, Claims 11-13 and 16 are rejected under 35 U.S.C. §103(a) over Takeuchi. However, Claim 18 is not rejected over Takeuchi. Claim 18

is canceled and incorporated into independent Claim 1. Thus, the claims are patentable over Takeuchi.

Claims 1-3, 5-7 and 9-18 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,287,720 ("Yamashita"). Yamashita discloses a conventional battery using a heavy casing (abstract, line 6; column 3, line 29), instead of the inventive adhesive layer, to hold together the positive and negative electrodes. Although Yamashita at column 7, line 66 to column 8, line 2, discloses a binder in which a *volume ratio* of binder to insulating particles can be from 1/500 to 5/3, Yamashita's examples disclose only a particle to binder *weight ratio* of 100/5 (=20)(see, e.g., Yamashita at column 26, lines 34-35 ("zeolite/PVDF weight ratio: 100/5"); column 28, lines 15-16, ("aramide/PVDF (sic) weight ratio: 100/5"); column 29, lines 63-64 ("α-Al₂O₃/PVDF weight ratio: 100/5"); column 33, lines 6-7 ("α-Al₂O₃/PVDF (sic) weight ratio: 100/5"))).

However, Yamashita is silent about adhesive layer peel strength. Because Yamashita's battery uses a heavy casing to hold electrodes together, Yamashita is not concerned with adhesive layer peel strength.

Yamashita's examples do not suggest the recited "predetermined peel strength in a range of from 50 gf/cm to 85 gf/cm". Summarized in Table A below are results taken from the tables in the specification and arranged in order of filler:resin weight ratio.

TABLE A

	Filler	Resin	Weight ratio (filler:resin)	Particle Size of Filler (μm)	Peel Strength (gf/cm)
Example 17	PMMA	PVDF	1:2	0.5	80
Example 6	alumina	PVDF	1:2	0.01	85
Example 1	alumina	PVDF	1:1	0.01	70
Example 3	alumina	PVDF	1:1	0.1	60
Example 4	alumina	PVDF	1:1	1	65
Example 8	alumina	PVDF	1:1	0.01	70
Example 9	alumina	PVDF	1:1	0.01	70
Example 10	alumina	PVDF	1:1	0.01	70
Example 11	alumina	PVDF	1:1	0.01	60
Example 12	alumina	PVDF	1:1	0.01	70
Example 13	silica	PVDF	1:1	0.01	50
Example 2	alumina	PVA	5:2	0.01	70
Example 14	silicon carbide	PVDF	3:1	0.5	80
Example 15	boron carbide	PVDF	3:1	0.5	80
Example 16	silicon nitride	PVDF	3:1	0.5	80
Example 7	alumina	PVDF	5:1	0.01	60
Comparative Example 5	alumina	PVDF	10:1	0.01	20
Yamashita's Examples 2 and 4-7	alumina, zeolite or aramide	PVDF	20:1	alumina: 1.0 (otherwise silent)	?

Results from Table A are compared with Yamashita's examples in the following FIG.

A, which plots peel strength v. filler:resin weight ratio.

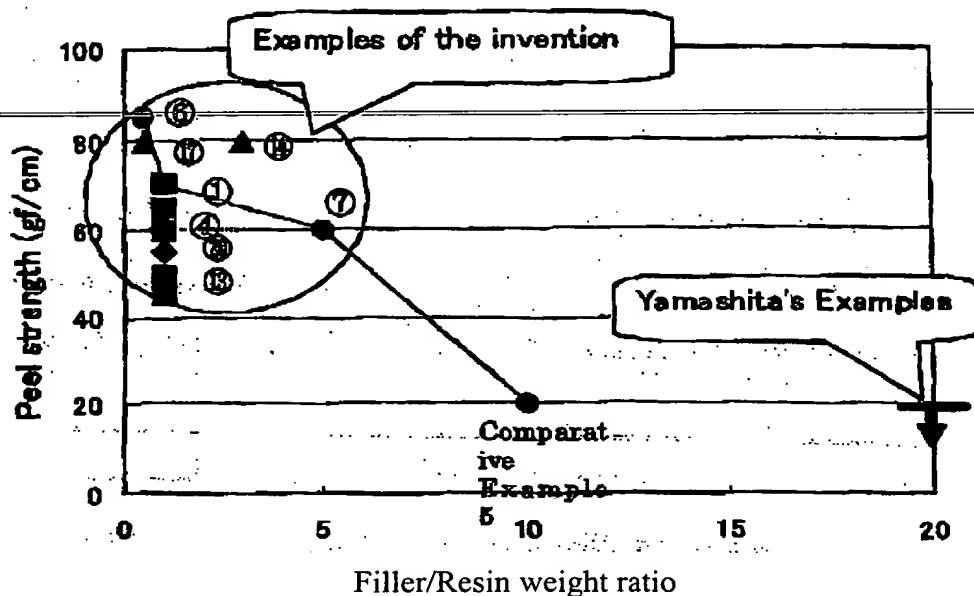


FIG. A: Comparison of peel strength

Table A and FIG A. show that when the filler:adhesive weight ratio reaches 10, the peel strength drops from the recited range of "50 gf/cm to 85 gf/cm" to only 20 gf/cm. Because Yamashita's examples have a even higher filler:adhesive weight ratio of 20 (i.e., even less adhesive), there is no reason to expect the binder layer of Yamashita's examples would exhibit a peel strength within the recited range of "50 gf/cm to 85 gf/cm".

Because Yamashita's examples are outside the recited "predetermined peel strength in a range of from 50 gf/cm to 85 gf/cm", and Yamashita is silent about using an adhesive layer instead of a conventional casing to hold together battery electrodes, Yamashita fails to have rendered obvious the claimed invention.

Claim 1 is objected to. To obviate the objection, "not less the" is replaced with --not less than--.

Claims 1-3, 5-7 and 9-18 are rejected under 35 U.S.C. §112, first paragraph. To obviate the rejection, Claim 1 is amended to recite "a weight ratio of the adhesive resin to the filler is not less than 1/5 and *not more than 2*" and "a predetermined peel strength in a range of from 50 gf/cm to 85 gf/cm".

Pursuant to M.P.E.P. §821.04, after independent product Claim 1 is allowed, Applicants respectfully request examination of method Claim 14, which includes all of the limitations of product Claim 1.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Corwin Paul Umbach

Norman F. Oblon
Attorney of Record
Registration No. 24,618

Corwin P. Umbach, Ph.D.
Registration No. 40,211

Attachment:

Marked-up copy of amendments



22850

Tel. (703) 413-3000
Fax. (703) 413-2220
NFO:CPU

I:\atty\Cpu\Nov02\00572521.aafr.wpd

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Amendment Filed Herewith

IN THE CLAIMS

Please cancel Claims 16 and 18 without prejudice or disclaimer of the subject matter
therein.

Please amend Claims 1 and 17 as follows:

1. (Four Times Amended) A battery comprising a battery body including:
a positive electrode and a negative electrode each containing an active material, where
the positive electrode and the negative electrode each has an uneven surface defining a space;
an electrolytic solution containing an electrolyte; and
an adhesive resin layer which is interposed in between the positive electrode and the
negative electrode and is joined directly to both the positive electrode and the negative electrode,
wherein

the adhesive resin layer consists of one layer and contains an adhesive resin and a filler;
the adhesive resin layer fills the space defined by the uneven surface of the positive
electrode and the space defined by the uneven surface of the negative electrode;

a weight ratio of the adhesive resin to the filler is not less [the] than 1/5 and not more than
2; and

the adhesive resin layer is connected to the positive electrode and the negative electrode
at a predetermined peel strength in a range of from 50 gf/cm to 85 gf/cm.

17. (Amended) The battery according to claim 1, wherein the [particles] particle size of
the filler is not more than 0.1 μm .

Please add new Claim 19 as follows:

--19. (New).--